**Impounded Rivers: Perspectives for Ecological Management**, by GEOFFREY E. PETTS. (*A Wiley–Interscience Publication in the Series:* Environmental Monographs & Symposia, Convener & Gen. Ed. NICHOLAS POLUNIN.) John Wiley & Sons, Chichester–New York–Brisbane–Toronto–Singapore: xvii + 326 pp., numerous figures & tables, 23 x 15 x 2 cm, hard cover, £24.50 or $36.95, 1984.

The world-wide disposition over the past five decades to build dams, has generated keen interest in what happens when an artificial lake is created. International conferences have drawn together an immense literature on the consequences in terms of the nature of the new ecosystems developing in the reservoirs and adjoining lands behind the dams, with most attention focusing on the large dams, such as those on the Colorado, Nile, and Volga, Rivers. Less systematic attention has been given to the consequences in the rivers that have been impounded. This book by Dr Petts is the first comprehensive effort to examine the entire range of environmental effects downstream from dams. It does so with admirable balance and lucidity.

Considering the possible number and complexity of topics to be covered, the book is remarkably concise and coherent. After reviewing the record of dam construction and subsequent river investigations, it presents a classification of rivers from an ecological point of view. Then follows a series of seven chapters, each outlining a set of possible effects and marshalling evidence as to their nature and the factors producing them. The individual chapters deal with hydrology; thermal, chemical, and current, aspects of reservoir releases; mineral and plankton transport; channel morphology; primary production and riparian communities; macroinvertebrate communities; and fish and fisheries. A closing chapter addresses management problems and prospects. The result is a handsome review of what might be the consequences of impoundment.

Like any other attempt to appraise a huge and disparate literature from many fields, the book cannot succeed in covering all possible reports of observations on effects. Readers may find gaps of special or esoteric studies with which they are familiar, but on the whole the coverage is good. Likewise, the Author cannot be expected to have verified all the findings he takes from the work of others, and there are instances, such as reference to Nile changes, where later or different findings may challenge those reports.

The book should not be taken as the final word on all the changes that have resulted from dam construction. Rather, it should be seen as an invaluable guide to modes of thinking about, and investigating the downstream consequences of, dam construction that has been completed or projects that may be planned.

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**Cypress Swamps.** Edited by KATHERINE CARTER EWEL & HOWARD T. ODUM. (Sponsored by the Center for Wetlands.) University Presses of Florida: University of Florida Press, Gainesville, Florida, USA: xviii + 472 pp., figures & tables, 27 x 22 x 4 cm, hard cover, US $25.00, 1985.

The studies reported in this volume result from the cypress wetland research projects which were founded jointly in the spring of 1973 by the Rockefeller Foundation and the National Science Foundation's Division of Applied Science and Research Applications, as well as from independent studies performed on other swamps. The objectives of the cypress wetland research projects were to understand cypress swamps, to analyse regional systems that include human economies and wetlands, and to explore the concept that humanity and Nature interfaces could maximize the vitality at once of local economies and their wetlands. A special objective was the use of cypress swamps for recycling of wastewater.

The purpose of the book is thus to help increase understanding not only of wetlands in general, but also of the regional organization of landscapes and the symbioses among adjacent land-uses. The king-pin of this enterprise has been the Center for Wetlands, University of Florida, which was founded with the granting of funds by the Board of Regents of the State of Florida in 1973.

There are 40 chapters, by combinations of 51 contributors—mainly from Florida, though 23 are from other States, one from Canada, and one from Puerto Rico—divided into three parts as follows: I, Ecological Patterns in Cypress Swamps; II, Effects of Wastewater on Cypress Domes; and III, Structure and Function of Other Swamps in Eastern North America. Chapter 40 is a summary by one of the Editors, Howard T. Odum, focusing on Cypress Swamps and their Regional Role.

*Understanding cypress swamps:*—Cypress swamps are only one type of forested wetland, but they are among the least understood of the world's huge variety of ecosystems. The central objective of Part I is to recognize general principles by which discrete ecosystems such as cypress swamps operate. A review of early literature on forested wetlands in the United States is first presented (A.E. Lugo), then in sequence detailed analyses of the morphology and biology of cypress trees (C.A. Brown), of seasonal patterns of a cypress 'dome'* in Florida (W.J. Mitsch), of water chemistry of a Florida cypress dome (F.E. Dierberg & P.L. Brezonik), of soils of cypress swamps (C.L. Coultas & M.J. Duever), and of geological variability among six cypress domes in North-Central Florida (D.P. Spangler).

The result is a survey of the characteristics of the spectrum of wetland types and species in the south-east, involving an examination of the physical environment and general ecological characteristics of cypress domes. Related studies of the structure and function of other swamps in Eastern North America (Part III) go one step further in facilitating understanding of cypress swamps by means of different case-studies.

*Cypress swamps and their regional role:*—First, effects of wastewater on cypress domes (Part II) are analysed in detailed studies, ranging from the description of study-sites (J.W. Ordway) and the hydrology of North-central Florida cypress domes (K. Heimburg) to effects of fire and wastewater on understorey vegetation in cypress domes (K.C. Ewel). There follow accounts of laboratory studies on the movement of poliovirus type 1 through cypress-dome soil (G. Bitton and associates) and the feasibility of cypress wetland tertiary treatment (W.R. Fritz & S.C. Helle). Disposal of wastewater into cypress domes at a time of constraints on the use of fossil fuel, has proved to be an alternative that is economically and ecologically feasible. From an ecological viewpoint the device is useful in conserving and filtering water, and in recharging ground-waters. Indeed, cypress swamps are conservative users of water.

* So-called because the grouped trees can look from afar like an architectural dome.—Ed.




 

Results reported in this book indicate that the ecobiomes and constituent ecosystems are well-suited for this use by human communities either with small wastewater volumes or with high densities of swamps nearby. In general, nearly 30% of Florida's wastewater may be treated in forested wetlands. As regards interface relations between cypress swamps and human economy, wastewater treatment means more than just another use of cypress swamps by humans (in addition to water-use, recreation, timber harvest, microclimate-panoramic green-belt, and a major part in development of the southeastern United States). That involves the recognition of the role of the environment in economic processes, and then its measurement and its prediction, following the principle of wetlands' attraction of economic investments and vitality (H.T. Odum). Even living in cypress swamps appears attractive, according to projects at the Whitney site, Florida (M.T. Brown).

Cypress swamps appear as self-organizing systems operating on solar energy. From the viewpoint of human economy, they represent an external contribution which is still a controversial subject, because in real terms no money is paid to wetlands. Maybe this point is not sufficiently developed, though some ways of obtaining a numerical estimate of the value of wetlands are proposed by H.T. Odum in the last chapter of the book. Here the interest is focused on the relations between cypress swamps and human economies—including important feedbacks from such environmental systems to the regional ecobiomes and their component ecosystems—and ultimately on their effects on human society.

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**The North Sea: Sea Use Management and Planning,** by HANCE D. SMITH & C.S. LALWANI. North Sea Research Unit, Centre for Marine Law and Policy, University of Wales Institute of Science and Technology, Cardiff, Wales, UK: 367 pp., 29 x 21 x 2 cm, paperback [no price indicated], 1984.

This report reminds me of the old joke about a man who asked the way to Bury St Edmunds, the reply was 'Well I would not start from here'. The North Sea is one of the most heavily utilized tracts of sea in the World. There is a long history, some of it surprisingly well documented, of its use for transport, fishing, and war. More recently there have been major expansions in its recreational use, the sophistication of defence, the quantities of waste reaching its waters by river, air, and direct input, the development of scientific and monitoring activity and, most recently of all, has been the explosion of activity in the exploitation of hydrocarbon and gravel resources. Each of these uses makes demands on the system which are frequently incompatible.

The problem that now faces the countries bordering the North Sea is how to optimize its use without damaging the environment (in its broadest sense). To compound the problems each nation has its own complex legislation and planning regulations, there is an intricate but incomplete series of international conventions and supranational bodies providing legalistic regulation of some activities, and there are local traditional users which are staunchly defended by their proponents. All these fit into a pot-pourri of management arrangements which have evolved through deriving a series of pragmatic solutions to short-term problems. Although these *ad hoc* arrangements work after a fashion, it takes only a modicum of insight to see that the acceleration of human activity in the North Sea will eventually lead to their collapse.

*Dangers of Intricacy*

How imminent is that danger? In order to alleviate the threat, this report provides a pilot study of sea-use management and planning in the North Sea—with the primary objective of establishing 'the geographical basis, the development of management, and the nature of data bases and information systems'. The term 'sea-use management' is used to describe the present hazy concept of a 'comprehensive approach towards the government of maritime affairs, including control of the interactions among the uses of the sea.' It begins logically with a description of the sea and a brief historical account of its uses. It then explores the development of management, starting with its spatial organization which deals with traffic movement patterns, ships and installations, navigation and control, and continuing with the derivation of the social demand for all forms of communication, traffic circulation and its control, safety and policing, defence and surveillance, and the patterns of development in fisheries, waste disposal, ship owning, mineral extraction, and recreation.

The report emphasizes throughout the need for high-quality and comprehensive data to be available to the managers. It also highlights the continuing problems that legislators have in defining their terms. For example, in this context what exactly is a coastal zone? As an ecologist I have no problem in defining such a term as a region where the environmental conditions change rapidly from terrestrial to fully marine. Yet this concept of a coastal zone is three-dimensional, ill-defined, and shows variability in both time and space. A lawyer, on the other hand, looks for a precise definition which is clear-cut. He wishes to know exactly when, if he figuratively takes a pace, he will step from the fully terrestrial or fully marine zones into the coastal zone. Hence in the Law of the Sea the scientific approach was discarded and many of the definitions are non-scientific—for example, the legal definition of the continental slope uses criteria that are based on technical capability for exploitation—so that, as our technical ability develops, legalistically there will cease to be any deep ocean.

Despite the need for precision in legal definitions, in order to gain consensus in many international conventions, ambiguities are purposely written into the wording. IUCN have recognized the need for conservationists to become more literate in legal terms through the work of its law centre. The conservation community as a whole must become far more aware of the precise meaning of words and the need to accommodate other people's priorities within these management plans. This latter point is where the conservation community might wish to build on the substantial foundation provided by this report.

*Different Attitudes of Oceanographers and Mariners*

I take gentle exception to this report over a number of points which reflect the difference in background between the Authors and myself. There is only space to explore a few of these differences in perspective. As an oceanographer I look inshore from the deep sea, seeing the North Sea as an extension of the ocean—linked to it and, as a system, driven as much by external forcing as by internal factors—whereas the Authors as mariners tend to view the North Sea much more as a unique and semi-isolated system. I feel